OCTOPUS® 900

User manual

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1 INTRODUCTION

We would like to thank you for your decision to purchase this Haag-Streit product. If the instructions in this manual are carefully followed we are confident that this product will give you reliable and trouble-free usage.

2 PURPOSE OF USE

The **Perimeter Octopus® 900** is used, at room temperature, in the examination, diagnosis and documentation of the differential light sensitivity and other functional aspects of the human eye. It is usually used by Ophthalmologists, Optometrists, Opticians, Orthoptists or other trained health personnel in their consulting rooms, clinics, hospitals or teaching facilities.

3 ITEMS SUPPLIED

We congratulate you on choosing the OCTOPUS 900 – 90° visual-field perimetry of the latest generation. Depending on your order, the items supplied are as follows:

- OCTOPUS 900
- Accessory kit
- optional support stand

Please check the delivery with care

1 x OCTOPUS Perimeter 900	1803000
1 x accessory kit, consisting of:	
1 x patient-response button	1802439
1 x Ethernet switch 100Mbps	1803090
2 x Ethernet cable	1803094
1 x dust cover	1803061
1 x instruction manual	7220031
1 x CD with all Octopus 900 and EyeSuite Perimetry manuals	7220030
1 x eye occluder set	1802349
2 x spare fuses (T3.15 A / 250 V)	3000481
1 x support stand, consisting of:	
1 x stand base	1801187
1 x O-900 table top	1803051
1 x set of accessories for support stand	1801194

Please keep all packaging material, as this can be reused for possible returns or when relocating.

4 SAFETY INFORMATION

4.1 General points

- The appliance must only be used for the purpose described in this instruction manual.
- Note that condensation may form on the cold surfaces of the appliance if it is brought into the operating area from a colder place. If this occurs, leave the appliance to stand for an hour or two, and do not switch on until the temperature is equalised and the device has dried out.
- All examination of patients, operation of the appliance and interpretation of the results obtained must be carried out by properly trained and qualified persons.
- The appliance, which is installed on a height-adjustable support stand, is designed for medical use in a darkened room.
- Please keep this instruction manual near the appliance at all times, in a place where it can be accessed easily by operating staff. Warranty claims will only be considered if the instructions in the manual have been followed as specified.
- The doctor or medical professional operating the device must inform patients of the safety requirements that affect them, and ensure that these are followed.
- Ensure that the appliance is only connected to a power supply that matches the specifications given on its type plate. Note that the ON/OFF switch DOES NOT shut off the mains power supply to the perimeter. Before carrying out cleaning or maintenance work of any kind, ensure that the appliance is unplugged from the mains power socket.
- Do not use the appliance in explosion-hazard zones, and do not store volatile solvents (such as alcohol or benzene) or other flammable substances nearby.
- Always remove the dust cover before switching on the power, as failure to do so may result in irreparable damage to the light sources.
  In the same way, ensure that the appliance is switched off before covering it.
- The removal of housing components and repairs must only be carried out by suitably-trained specialists who are qualified and authorised to do so. Attempts to carry out unauthorised repairs are likely to result in danger to operating staff and patients.
- Use only original spares and accessories when carrying out repairs.

4.2 Ambient conditions

• Transport	Temperature	-40°C	to	+70°C
	Air pressure	500hPa	to	1060hPa
	Relative humidity	10%	to	95%
• Storage	Temperature	-10C	to	+55°C
	Air pressure	700hPa	to	1060hPa
	Relative humidity	10%	to	95%
• Usage	Temperature	+10°C	to	+40°C
	Air pressure	700hPa	to	1060hPa
	Relative humidity	20%	to	75%

Environmental considerations

- Note that scrap electrical and electronic equipment must be disposed of separately from normal household waste. This appliance was placed in circulation after 13.08.2005.
- Please arrange for the appliance to be sent to a local collection point or your Haag-Streit distributor when it reaches the end of its service life.
- This will prevent contaminants escaping into the environment, while helping to ensure that valuable raw materials can be recycled.

4.3 Mains connection

- Use only a type-approved, three-wire electric power supply lead. In order to lessen the risk of electric shock, this appliance must be properly grounded.
- The plug, cable and ground connection to the power socket must be free of damage and in full working order.

4.4 Transporting the appliance

Keep the appliance in its original packaging when transporting over long distances. When moving over short distances, lift the device with both hands, holding it in the area around the lower cupola (see also section 6.5.2).

4.5 Special instructions in text

Further safety instructions are added throughout the text as required. They are classified according to importance, and designed to help avoid risk to patients and operating staff, while preventing damage to the perimeter appliance and helping to ensure that it functions safely and remains in perfect working order.

	DANGER	**Instruction that must be followed at all times in order to prevent risk to patients and operating staff.**
!	**CAUTION**	**Instruction that must be followed in order to prevent damage to the appliance.**
☞	**NOTE**	**Instruction designed to ensure that the perimeter appliance functions smoothly and without giving trouble.**

This handbook contains descriptions of all the functions of the OCTOPUS 900. Certain functions are supplied as options, and may not be available or activated on your particular appliance.

5 WARRANTY AND PRODUCT LIABILITY

- The appliance and its accessories are made of high-quality materials and manufactured to the latest technical standards. They left our factory in a perfect state of repair. If an incident should occur however, please contact your dealer.
- The manufacturer supplies the appliance with a one-year warranty, counted from the date of purchase. The warranty covers malfunctions and defects attributable to faulty materials or design. The warranty does not cover malfunctions or defects arising from incorrect use or external factors.
- Any attempt to carry out unauthorised repairs will immediately void all warranty liability.
- Continued use of a product that has been damaged by incorrect operation can lead to personal injury. The manufacturer will accept no liability whatsoever in such cases.
- Before unpacking the appliance, check the outside of the packaging for signs of incorrect handling and possible damage. If you do detect such damage, please notify the carrier who carried out delivery, and unpack the appliance in the presence of a representative from the transport firm concerned. You should then make out a report detailing any damage detected. The report should be signed by you and the carrier's representative.

5.1 Safety requirements

- The OCTOPUS 900 appliance has been designed and manufactured in accordance with standards IEC / EN 60601-1, EN ISO 15004 and EN ISO 12866. Manufacture, testing, setup, maintenance and repair are carried out in conformity with the corresponding Swiss and international standards.
- The appliance's CE designation shows the conformity of the OCTOPUS 900 with European Directives 93/42/EEC and 89/336/EEC, and conformity module A.
- Haag-Streit can supply a copy of the corresponding European Declaration of Conformity on request at any time.
- The statutory accident-prevention regulations must be observed.
- Classification

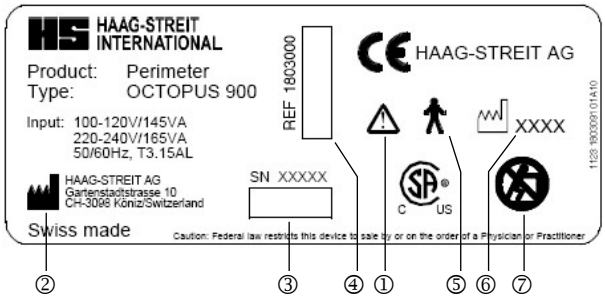
Norm IEC 60601-1 / EN 60601-1	The Perimeter OCTOPUS 900 conforms to equipment safety class I.
	Application unit type B
	Operating mode: Continuous operation
European Directive 93/42/EEC	Class I

EMC

The OCTOPUS 900 meets the electromagnetic compatibility requirements of IEC / EN 60601-1-2. The appliance is designed to keep the generation and emission of electromagnetic interference to a level that does not affect the normal operation of other items of equipment. The appliance is likewise designed to provide a certain level of resistance to outside sources of electromagnetic interference.

5.2 Type plate

① **Read through the instruction manual with special care**
② Manufacturer
③ Serial number
④ Appliance number
⑤ Product classification type B
⑥ Date of manufacture
⑦ **Do not push**



5.3 Pictogram symbols

	Ground connection lead.
	Do not push. The appliance is liable to tip over if pushed from the side.
	This appliance conforms to European Directive 2002/95/EC (RoHS).

6 INTRODUCTION

6.1 OCTOPUS Perimeter 900

The OCTOPUS 900 is an automatic projection perimeter for the examination of the whole field of sight (90°).

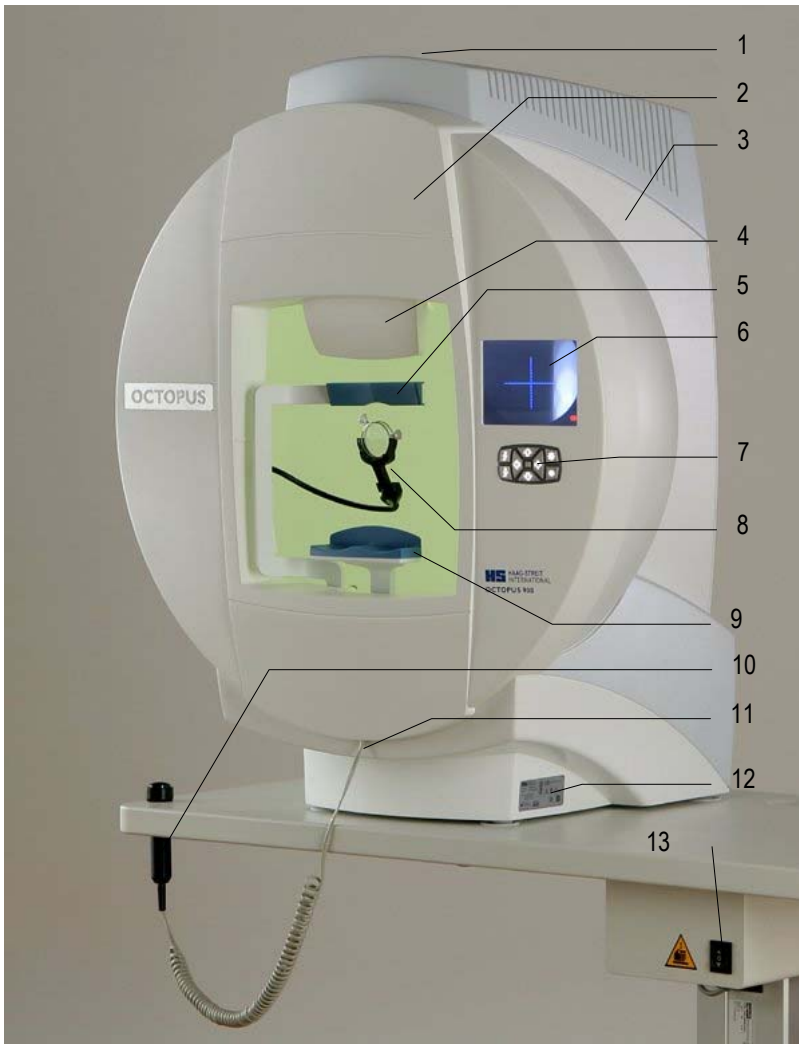
The system is divided into an examination element (OCTOPUS 900) and a control unit (notebook computer or PC). The examination element communicates with the external PC via an Ethernet link. The OCTOPUS 900 is controlled using the software installed on the PC. The perimeter may be controlled, if required, from a fully-lit adjacent room.

The integrated, automatic patient-fixation control function guarantees the reliability of diagnosis.

The OCTOPUS 900 is suitable for both clinical and investigation purposes, as its flexibility is virtually unlimited.

Thanks to its spherical, Goldmann-type cupola design, the OCTOPUS 900 tests the entire field of sight (up to 90° eccentricity). The flexibility of this appliance allows it to deal with all perimetry tasks, both in the 30° and 90° range, using kinetic, static or flicker perimetry.

New PC and perimetry software can be downloaded and updated by going to www.octopus.ch.



Components

1 Top cover for stimulus projector
2 Front cover
3 Housing / Cupola
4 Mirror unit cover
5 Forehead rest
6 Display
7 Key panel
8 Refractive lens holder with IR eye illumination and refractive lenses
9 Chinrest
10 Response button
11 Response button connector
12 Type plate
13 Table height adjustment

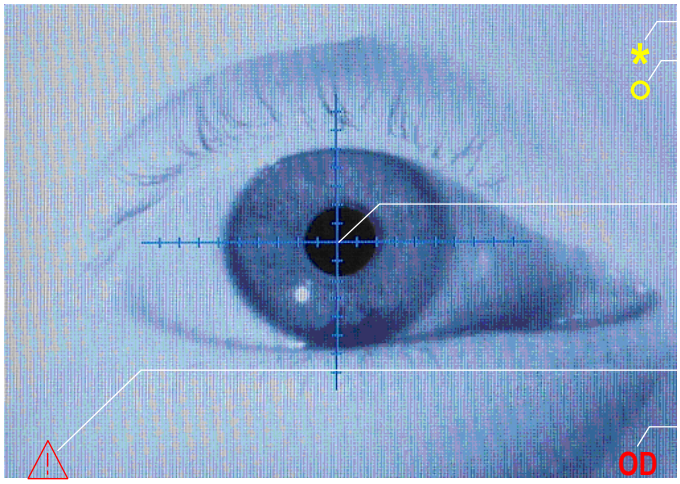


Fig. 6-1

LCD display

The high-contrast TFT colour display allows the video image to be viewed from an oblique angle. The following messages are displayed on-screen:

14 Indication of a '✶' during stimulus presentation.
15 Indication of an 'O', if the patient-response button is pressed.
16 The crosshairs help to centre up the eye, scale = 1mm intervals.
17 Display of left (OS) or right eye (OD)
18 Warning or error message

Fig. 6-2

Control panel

The control panel consists of an easy-to-use keypad made of soft but hard-wearing rubber material. All buttons are backlit with white light to facilitate their use in a darkened room.
The backlighting can be disabled, if required, by adjusting the display brightness settings.

19 Turning the refractive lens holder in and out
20 Display brightness settings
21 Adjustment of chin support
22 Start examination

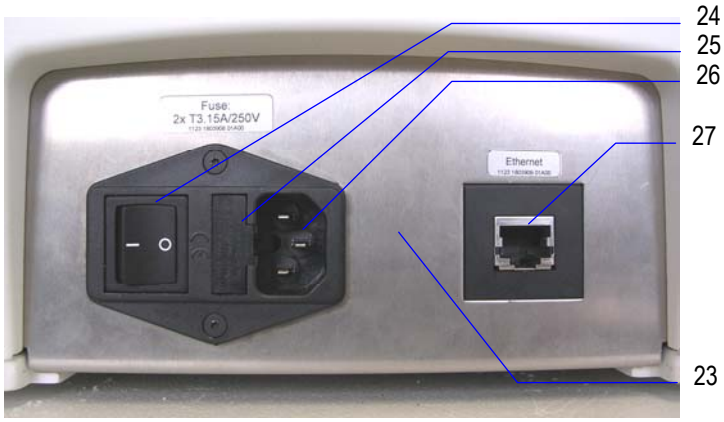


Fig. 6-3

Connections

23 Plug-in mains power unit
24 Mains switch
25 Holder for two T3.15AL/250V fuses
26 Mains connection
27 Ethernet connection

DANGER All externally connected appliances and items of equipment must conform to the relevant safety standards.

6.1.1 Housing

Optical and electronic components are protected from light and dust by five housing covers. They can be removed in just a few moments for the purpose of servicing. Once the four screws in the back panel have been removed, the panel, hood and both IR covers can be lifted out. The optical unit and electronic components of the OCTOPUS 900 are now accessible.

⚠	**DANGER**	Always disconnect the appliance from the mains power supply before opening it. The removal of housing components must only be carried out by suitably-trained specialists who are qualified and authorised to do so.

6.1.2 Cupola

The cupola of the OCTOPUS 900 has a diameter of 600mm, and thus conforms to the Goldmann standard. Test zones with eccentricity up the following levels can be measured:

- Nasal 60°
- Temporal 89°
- Superior 60°
- Inferior 70°

6.1.3 Forehead rest

A wide, ergonomically-designed forehead rest allows the patient to remain in a comfortable position while examination is taking place.

6.1.4 Chin rest with sensors

The four buttons on the control panel are used to adjust the chin rest and thus the position of the head. Fine adjustment can also be carried out from the control unit (PC) using the computer mouse. Sensors in the chin rest detect if the patient's head is correctly positioned.

6.1.5 Refractive lens holder module

An automatic swing arm allows the refractive lens holder to swing in an out during the examination, without having to alter the position of the patient. This swing arm can be operated either from the control panel or on-screen with the computer mouse. Once the refractive lens holder has been swung in, it can be fine-adjusted to the correct distance with respect to the eye being examined.

!	**CAUTION**	Always use the control-panel buttons on the device itself or on-screen control from the PC to swing the refractive lens holder in an out. Do not attempt to move the refractive lens holder manually.

6.1.6 Refractive lens holder

Refractive lenses can be used during examinations within 30° eccentricity. The corresponding lenses are inserted before the test. The refractive lens holder can be tipped forward by about 25° to make it easier to insert the refractive lenses.

Fig. 6-4 Swing out the lensholder to insert lenses

Fig. 6-5 Insert spherical lenses towards the patients eye and cylindrical lenses towards the cupola

Additional refractive correction for presbyopia:

30-40yrs	+1.0
40-45yrs	+1.5
45-50yrs	+2.0
50-55yrs	+2.5
55-60yrs	+3.0
>60yrs	+3.25

Note: Primary goal of the refractive correction is that the patient can see the fixation target in focus.

6.1.7 Patient-response button

The patient-response button is connected to the underside of the head-support mounting (RJ11 jumper cable).

6.1.8 Mains connection

The Ethernet connection socket is located at the back of the appliance. Always use a **crossover shielded cable of category 5e** designed to transmit reliably at 100MHz. This network connection is electrically isolated, with electrical strength of 4kV, in conformity with IEC / EN 60601-1.

6.1.9 Light sources

LEDs are fitted for the purposes of periphery or background lighting, fixation help and stimulus. LEDs do not emit any heat, so no active cooling system is required in this respect.

6.1.10 Light intensities

The intensity of stimulus and periphery light is measured by independent light-sensors and compared to the preset default values every time the perimeter is switched on.

6.1.11 Stimulus

The stimulus light is projected indirectly into the cupola via a mirror unit. The user-defined programs offer a selection of five different diaphragm diameters (Goldmann I - V). Stimulus intensity-damping is infinitely adjustable via the electronic control system. Stimulus presentations of 100-500ms are permitted. A mechanical lock und optical damping elements are no longer required.

White stimulus for W/W perimetry and optional blue und red stimulus for B/Y and R/W are possible.
Stimulus intensity is detected by a light sensor, which also serves as a reference point for the system of coordinates for test locations. The stimulus LED has a service life of >20,000h and is thus maintenance-free.

6.1.12 Periphery or background lighting

White background brightness amounts to 31.4 or 4asb for W/W perimetry. You can also select a yellow background with 314asb for B/Y perimetry. Background brightness is based on two light sources, each fitted with several LEDs. The background LEDs have a service life of >20,000h and are thus maintenance-free. Background brightness is detected by a separate light sensor.

6.1.13 Fixation marks

Three different fixation marks can be selected and their brightness infinitely adjusted by electronic means. The light source is a maintenance-free green LED with a service life of >20,000h.

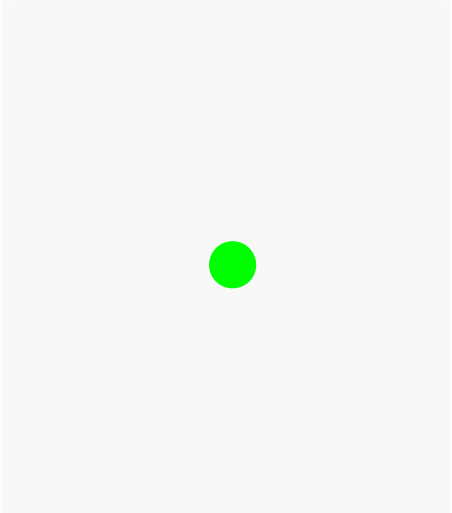


Fig. *6-6 (centre point)*

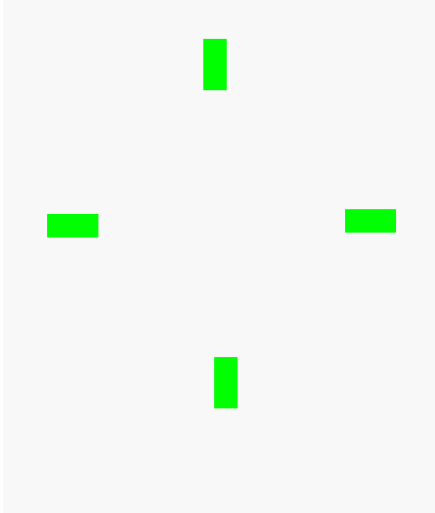


Fig. 6-7 (cross markers)

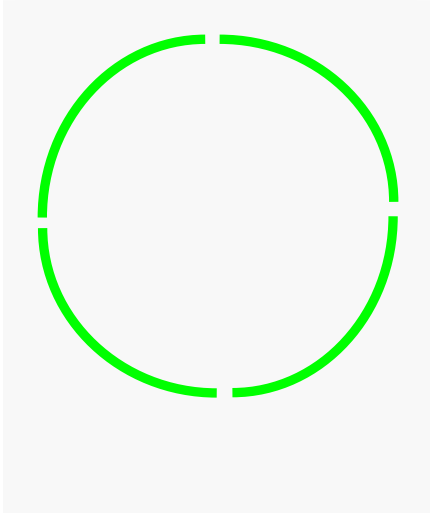


Fig. 6-8 (circle)

6.1.14 Fixation control

The eye being examined is illuminated with IR LEDs, photographed by a CMOS camera and shown on the LCD display. The built-in, automatic fixation-control function guarantees the reliability of diagnosis. Precise positioning of the eye being examined is carried out by motorised fine-adjustment of the chin rest.

6.1.15 Diagnosis data

All diagnosis data are transferred via the Ethernet connection to the control unit (PC / Laptop) for processing and saving to a database. The use of a second Ethernet connection (LAN card) allows these data to be exported to a server. Diagnosis data can also be printed out using a printer connected to the control unit.

6.2 Octopus 900 control unit / PC

A standard PC can be used as a control unit for the Perimeter. The control-system software runs on WINDOWS XP.

6.2.1 Minimum PC requirements

- Pentium III / 1.7GHz
- 512 MB RAM
- 40GB hard disk
- CD-ROM / DVD
- T100 (100MHz) Ethernet interface

6.3 Support stand

An electrically adjustable support stand (available as an option) allows the appliance to be adjusted easily and smoothly to the individual patient. The support stand offers ample legroom and is wheelchair-compatible.

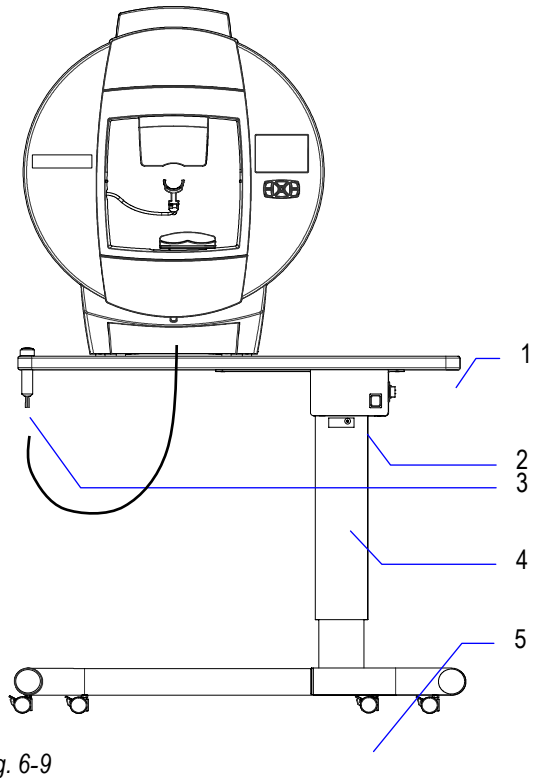


Fig. 6-9

Support stand

1 Table top with mountings for patient-response button
2 Electrical connection box
3 Patient-response button
4 Electrically-actuated lifting column
5 Stand feet with castors

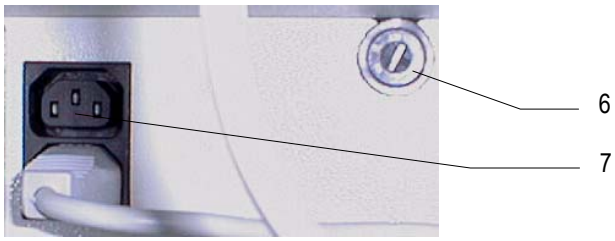


Fig. 6-10

6 Electrical voltage selector in electrical connection box
7 Power socket for connection of the OCTOPUS 900

DANGER Check that the mains voltage is correct before connecting to the power supply.

Fig. 6-11

Mains connection with fuse holder on electrical connection box.

Fig. 6-12

ON/OFF switch on electrical connection box.

DANGER Take special care, especially when dealing with patients in wheelchairs, to ensure that the table top does not come into contact with the patient's legs.

6.4 Safe system configuration in accordance with IEC / EN 60601-1

6.4.1 System variant I, OCTOPUS 900 with laptop as control unit

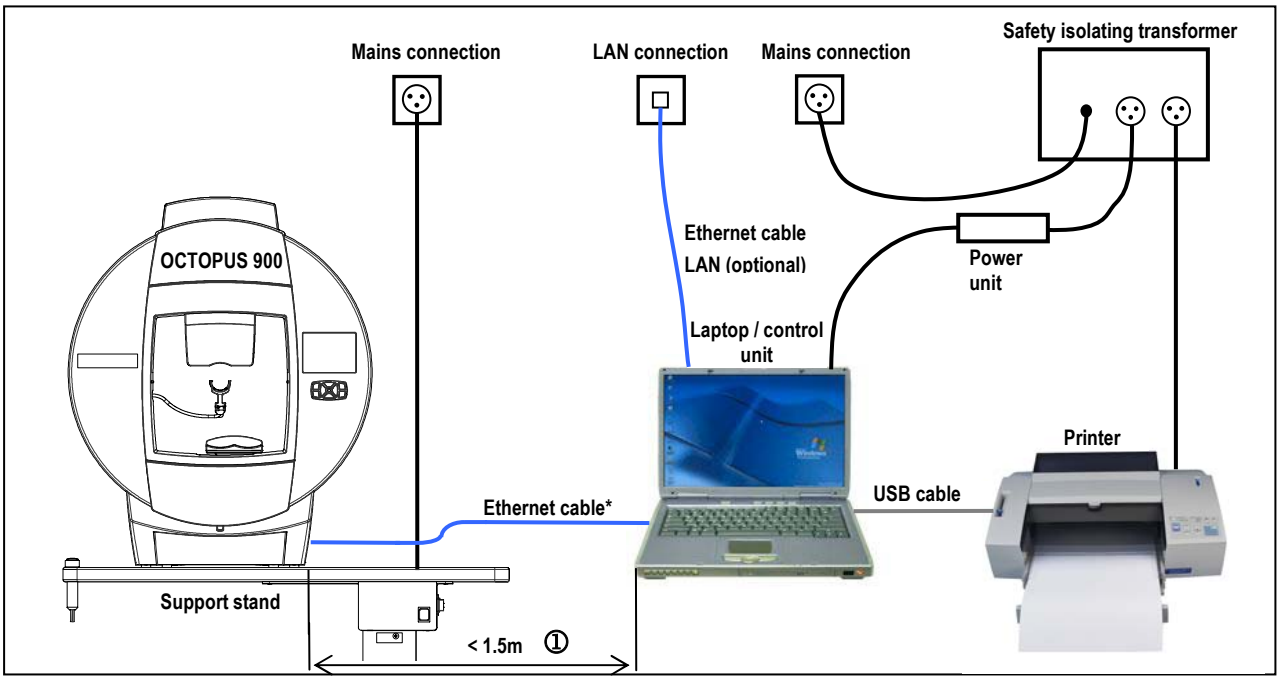


Fig. 6-13 , ***A network switch has to be placed in every situation between Notebook and Octopus 900**

6.4.2 System variant II, OCTOPUS 900 with PC and monitor as control unit

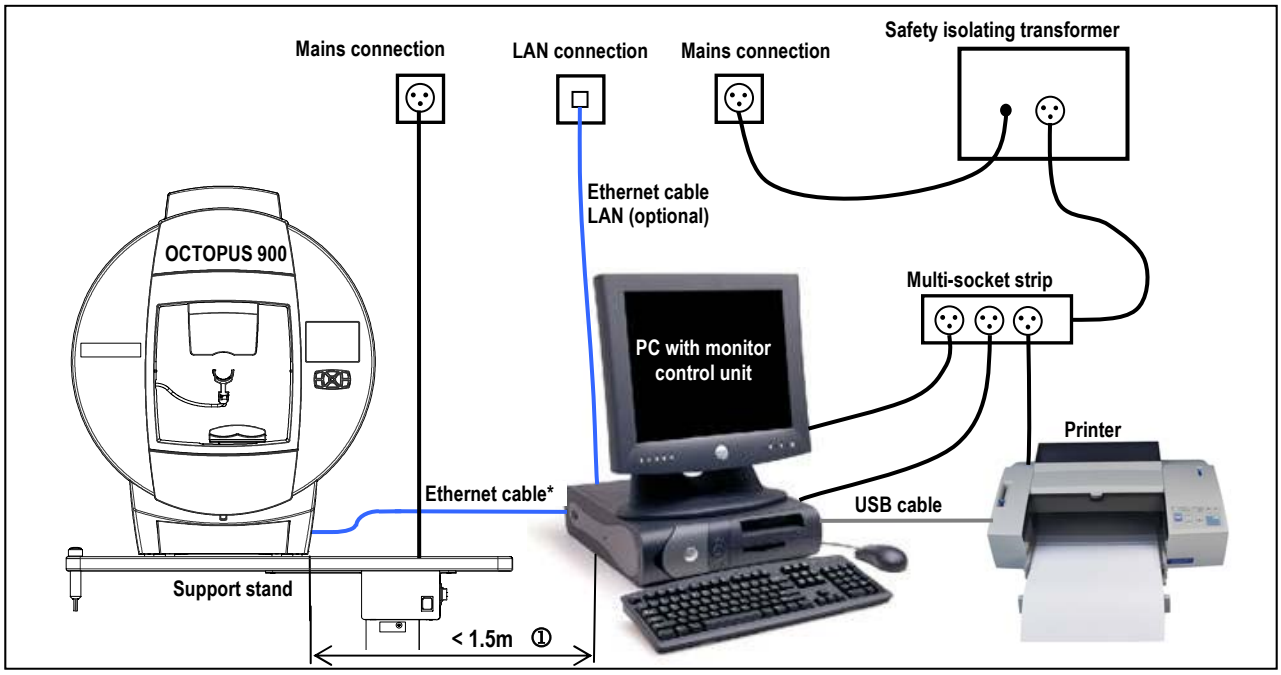


Fig. 6-14 ***A network switch has to be placed in every situation between the PC and Octopus 900**

Please note

① If the control unit (notebook computer or PC) and printer are farther than 1.5m from the OCTOPUS 900, there is no need for a safety isolating transformer conforming to IEC 60601-1 / EN 60601-1.

If a medically-approved control unit or a control unit with network element approved for medical use is in operation without a printer or optional LAN connection, neither a safety isolating transformer nor a distance of > 1.5m from the OCTOPUS 900 are required.

For safety reasons, you are however recommended to maintain the minimum distance of 1.5 m wherever possible. All other non-medical appliances and items of equipment must be operated via a safety isolating transformer.

6.5 Installation

6.5.1 Support stand

The support standard is supplied in a separate package. Assemble the support stand according to the instructions supplied with it, and ensure that you select the correct mains voltage before connecting the power supply lead.

6.5.2 OCTOPUS 900

Transporting and relocating the appliance (over short distances only)

a) Stand in front of the device and grasp it by the cupola with both hands before lifting (Fig. 6-15).

b) Stand to one side of the appliance, with one hand on the front cover and the other at the back. Then take a firm hold and lift (Fig. 6-16, Fig. 6-17).

Fig. 6-15

Fig. 6-16

Fig. 6-17

Push the patient-response button into its connection socket.

Fig. 6-18

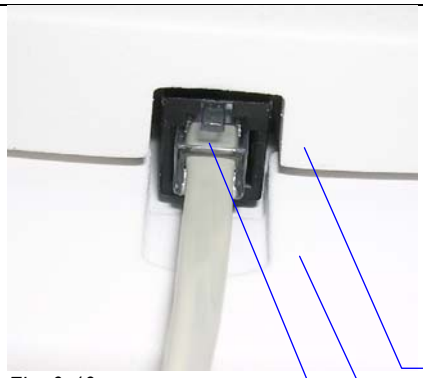


Fig. 6-19

The connection socket for the response button is located at the bottom of the front cover. The retaining catch on the connection plug of the response button faces forwards

CAUTION

!

The RJ11 plug is designed for connection of the patient-response button only. Do not use it with any other item.

- Push in the connection plug until you hear the retaining catch click into place. To remove the response button, push the retaining catch towards the headrest and pull the cable downwards.
- Connect the OCTOPUS 900 and PC with the Ethernet cable or integrate the Perimeter appliance into a LAN. You are recommended to use a direct connection, as variations due to network load can affect the diagnostic performance of the appliance. Further information can be found in section 6.4 *'Safe system configuration in accordance with IEC* / EN 60601-1*'*.
- Connect the electric power supply lead. The integrated mains-power units operate at the voltages specified in section 9.1 *'Technical specifications'*. There is no need to make a voltage selection on the appliance itself. If the appliance is supplied with a support stand, the OCTOPUS 900 can be connected to the plug socket in the electrical box on the stand.

7 INSTALLATION AND USAGE OF EYESUITE PERIMETRY SOFTWARE

Instructions on how to use the appliance for diagnostic purposes and a description of the EyeSuite™ user software are included in a separate manual.

Fig. 7-1

8 CARE AND MAINTENANCE

DANGER

- The housing components of the Perimeter appliance must only be removed by suitably-qualified service personnel.
- Note that the ON/OFF switch DOES NOT shut off the mains power supply to the perimeter. Before removing the housing components, ensure that the appliance is unplugged from the mains power socket.
- All repairs must be carried out by suitably-trained specialists who are qualified and authorised to do so. Attempts to carry out unauthorised repairs are highly likely to result in danger to operating staff and patients.
- Any parts that are removed must be replaced with original spares supplied by HAAG-STREIT or one of its authorised dealers.
- Failure to follow the instructions in this manual may result in warranty claims being invalidated.

The OCTOPUS 900 is practically maintenance-free, and requires only a minimal amount of care to ensure that it remains in full working condition. We nevertheless recommend that you have the Perimeter appliance serviced regularly by a qualified technician. HAAG-STREIT or your local dealer will be pleased to supply you with further information.

8.1 Cleaning

An occasional dusting and wipe-down with a damp cloth is sufficient. Dried-on dirt can be removed using a cloth dampened with water or alcohol.

! **CAUTION** Do not allow the appliance to become wet and do not use solvents of any kind.

The accessory kit supplied with the OCTOPUS 900 includes a dust cover. Cover the appliance whenever the room is being cleaned or if it is to be out of use for any length of time. Always remove the dust cover before switching on the power.

! **CAUTION** Do not cover the appliance while it is switched on, as this can cause build-ups of heat and a possible fire hazard.

8.1.1 Cupola

The inner surface of the cupola is coated with a special paint finish designed to ensure optimum results for perimetric examinations. The inner surface only requires occasional cleaning. Normal practice is as follows:
Dust twice a year with a soft, long-bristle brush. Do this carefully, so as not to scratch the surface. If more intensive cleaning is required, use a solution of mild detergent and a soft cloth.

8.1.2 Response button, chin and forehead rest, eye occluder

These items are all made of easy-to-clean plastic materials. In order to preserve their hygienic state, wipe down regularly with a soft cloth or piece of cotton wool moistened with alcohol.

8.1.3 Display, control panel

Fingerprints and dust can be removed using a soft, moist cloth.

8.2 Light sources

In contrast to other perimetry devices, perimeter and stimulus lighting on the OCTOPUS 900 is supplied by LED light sources. These have a virtually unlimited service life. If any of the LEDs should ever require replacement however, please contact your dealers' customer service department.

9 APPENDIX

9.1 Technical specifications

Manufacturer

HAAG-STREIT AG
Gartenstadtstrasse 10
CH-3098 Köniz / Switzerland

9.2 Instrument OCTOPUS 900

Designation:	**OCTOPUS 900**
Power requirements:	100 – 120VAC, 220 - 240 VAC
Power consumption:	145VA, 165 VA
Operating frequency	50 / 60 Hz
Fuses:	2 x T3.15 AL 250 V
Classification:	Class I, Type B
Measures (W x L x H):	648mm x 519mm x 796 mm
Weight:	25 kg
Shipping size (W x L x H):	800mm x 600mm x 900mm
Shipping weight:	40 kg
Temperature:	Operation: +15°C ... +40°C
	Storage, Transport: -40°C ... +70°C
Humidity:	Operation: 20% ... 75%
	Storage, Transport: 10% ... 95%
Operation principle:	Projection cupola perimeter
Measurement principle:	Bracketing procedure (depending on testing strategy)
Patient positioning:	Adjustable headrest
Fixation control:	Permanent video based fixation control
Eccentricity:	90°
Measurement range:	0 ... 47 dB
Measurement accuracy:	0.5dB
Max. stimulus intensity:	1910 cd/m^2 (6000 asb)
Stimulus color (I):	White (wide spectrum white LED)
Stimulus color (II):	Blue (440nm +/- 25nm)
Stimulus color (III):	Red (> 610nm)
Stimulus size:	Goldmann I, II, III, IV, V
Stimulus duration:	100 ms, 200 ms, 500ms,
Stimulus interval:	Adaptive, fix 1 ... 4 sec
Background intensity (I):	4asb (1.27cd/m^2), 31.4asb (10cd/m^2)
Background color (I):	White (LED)
Background intensity (II):	314 asb (100cd/m^2)
Background color (II):	Yellow (> 530 nm)
Interface:	Ethernet T100
Display:	Color TFT Display (320 x 240 Pixel)

9.2.1 Support stand for OCTOPUS 900 (optional)

Model type designation:	**M-table 900**
Mains voltage:	100 V / 60 Hz, 115 V AC / 60 Hz, 250 V / 50 Hz
Power consumption:	100 / 115 V / 1 A, 250 V / 0.5 A
Fuses:	2 x T4AH 250 V
Dimensions (W x D x H):	600 x 520 x 680 / 880 mm
Support surface:	0.31 m^2 (600 x 520 mm)
Weight:	15 kg
Transport dimensions:	650 x 570 x 730 mm
Transport weight:	20 kg
Functioning principle:	Lifting column (electrically actuated and infinitely adjustable)

9.3 Safety regulations

This perimeter appliance conforms to the international safety requirements established in EN 60601-1, Class I, Type B.

EMC

The OCTOPUS 900 meets the electromagnetic compatibility requirements of IEC / EN 60601-1-2. The appliance is designed to keep the generation and emission of electromagnetic interference to a level that does not affect the normal operation of other items of equipment. The appliance is likewise designed to provide a certain level of resistance to outside sources of electromagnetic interference.

European Directives

- 93/42/EEC (medical equipment products)
- IEC60601-1-2 (Electromagnetic compatibility – EMC)

Certified Quality Management System
SQS
EN ISO 13485
Reg. Nr. 11956

Norms and standards

- IEC / EN60601-1:2005
- EN 60601-1-2: 2001 + prA1
- IEC 60601-1-2: 2001 + A1: 2004
- EN ISO 15004-1: 2006
- EN ISO 12866: 1999 + AC:2000
- IEC 60825-1: 2001-08 Ed. 1.2
- CIE S 009/E: 2002

C SA US

PRODUCT IS CERTIFIED FOR BOTH THE U.S. AND CANADIAN MARKETS, TO THE APPLICABLE U.S. AND CANADIAN STANDARDS.

CE

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We reserve the right to change specifications without prior notice